Abstract Submitted
for the DAMOP10 Meeting of
The American Physical Society

Ultracold dipolar collisions of KRb molecules in a 2D confined geometry[1] GOULVEN QUEMENER, JOHN BOHN, JILA, University of Colorado — Ultracold fermionic polar molecules of $^{40}K^{87}Rb$ in their absolute rovibronic and hyperfine ground state [1] have been recently created and pave the way to probe ultracold chemistry of polar molecules [2]. When an electric field is applied, KRb + KRb $\rightarrow$ K_2 + Rb_2 chemical rates increase as the sixth power of the molecule induced dipole moment [3], due dominantly to head-to-tail collisions. As a consequence, chemical reactions are enhanced in an electric field and are unfavorable to long lifetimes of polar molecules. To prevent these collisions, an additional optical lattice can be used to confine the molecules in two dimensions. In this talk, we will present a theoretical investigation of ultracold dipolar collisions of indistinguishable KRb molecules in a presence of an electric field in a 2D confined geometry. We will present expected chemical rates as a function of the electric field and discuss if this will be favorable to achieve evaporative cooling of a dense sample of KRb molecules. [1] Ni et al., Science 322, 231 (2008) ; Ospelkaus et al., Phys. Rev. Lett. 104, 030402 (2010). [2] Ospelkaus et al., arXiv:0912.3854, Science, in press (2010). [3] Quéméner et al., Phys. Rev. A, in press (2010) ; Ni et al., arXiv:1001.2809, submitted (2010).

[1]This work was supported by an AFOSR-MURI grant.

Goulven Quemener
JILA, University of Colorado

Date submitted: 21 Jan 2010 Electronic form version 1.4